

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C. 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 12 October 2000 (12.10.00)	
International application No. PCT/US00/00470	Applicant's or agent's file reference NU-467Aq999
International filing date (day/month/year) 07 January 2000 (07.01.00)	Priority date (day/month/year) 08 January 1999 (08.01.99)
Applicant KARGER, Barry, L. et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
03 August 2000 (03.08.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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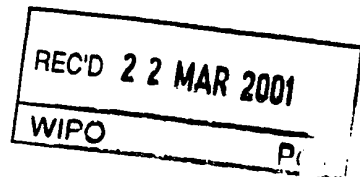
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer R. Forax
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference NU-467AQ999	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/00470	International filing date (day/month/year) 07 JANUARY 2000	Priority date (day/month/year) 08 JANUARY 1999
International Patent Classification (IPC) or national classification and IPC IPC(7): HO1J 49/00, 49/04, 49/10; G01N 27/26 and US Cl.: 250/288; 204/600		
Applicant NORTHEASTERN UNIVERSITY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 03 AUGUST 2000	Date of completion of this report 25 FEBRUARY 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JOHN S. STARSIAK JR. Jean Proctor Paralegal Specialist Telephone No. (703) 308-0661

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/00470

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☒ the description:

pages 1-21, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

☒ the claims:

pages 22-24, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

☒ the drawings:

pages 1-9, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

☒ the sequence listing part of the description:

pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
☒ the claims, Nos. NONE
☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/00470

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)

Claims 2-6 YES

Claims 1 NO

Inventive Step (IS)

Claims 2-6 YES

Claims 1 NO

Industrial Applicability (IA)

Claims 1-6 YES

Claims NONE NO

2. citations and explanations (Rule 70.7)

Claim 1 lacks novelty under PCT Article 33(2) as being anticipated by Xue et al.

The device of Xue et al clearly discloses all the structure recited in claim. Specifically, Xue et al discloses a microfabricated structure (glass microchip) having a integrated array of channels and electrodes (see figure 1).

Applicant's remarks are not well-taken because the applicant is relying on non-structural recitations in an apparatus claim for novelty. It is well-established that apparatus must distinguish over the prior art by structural recitations. For example, the applicant argues that the recitation "for gas transport" renders claim 1 novel. This is statement of intended use, e.g. it is not a structural limitation.

Claims 2-6 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a microfabricated system comprising a fluid sample handling microdevice having multiple channels; and a electro-pneumatic distributor comprising a microfabricated structure having an integrated array of channels for gas transport and electrodes, said channels and electrodes being oriented to permit the simultaneous or sequential application of electric current and pressure to individual said channels of said sample handling microdevice. The prior art does not teach or suggest a system comprising either an electrospray interface having multiple electrospray tips or a deposition interface having multiple deposition tips; an electro-pneumatic distributor comprising a microfabricated structure having an integrated array of channels for gas transport and electrodes, said channels and electrodes being oriented for supplying pressure and electric current simultaneously to the individual deposition tips of either said electrospray interface or said deposition interface; and a gasket in between said interfaces and said electro-pneumatic distributor. The claimed devices would be useful for supplying sample to devices such as mass-spectrometers.

(Continued on Supplemental Sheet.)

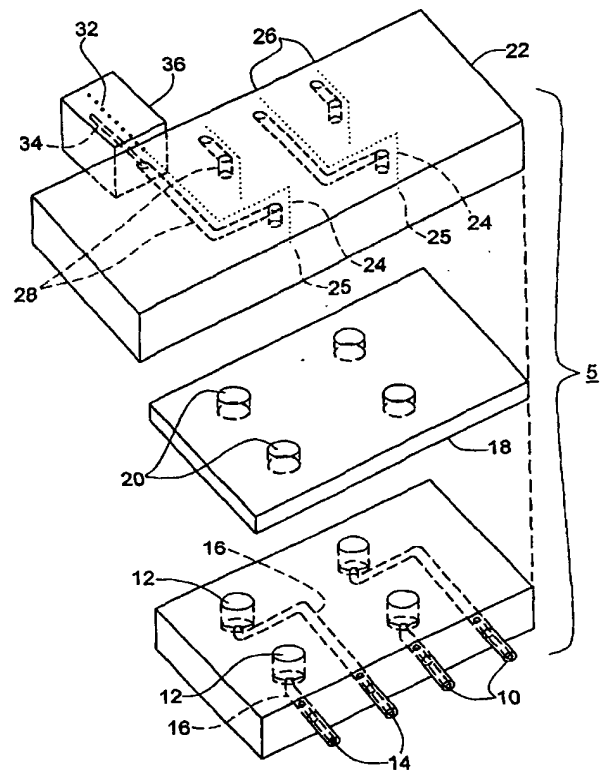
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H01J 49/00, 49/04, 49/10, G01N 27/26		A1	(11) International Publication Number: WO 00/41214
			(43) International Publication Date: 13 July 2000 (13.07.00)
(21) International Application Number: PCT/US00/00470 (22) International Filing Date: 7 January 2000 (07.01.00) (30) Priority Data: 60/115,167 8 January 1999 (08.01.99) US (71) Applicant (for all designated States except US): NORTH-EASTERN UNIVERSITY [US/US]; 360 Huntington Avenue, Boston, MA 02115 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): KARGER, Barry, L. [US/US]; 62 Deborah Road, Newton, MA 02159 (US). LIU, Huanghui [CN/US]; Apt. 3, 26 Pearl Street, Somerville, MA 02145 (US). FORET, Frantisek [CZ/US]; 525 Highland Avenue, Malden, MA 02148 (US). (74) Agents: HEINE, Holliday, C. et al.; Weingarten, Schurgin, Gagnebin & Hayes LLP, Ten Post Office Square, Boston, MA 02109 (US).			(81) Designated States: CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.

(54) Title: ELECTRO-PNEUMATIC DISTRIBUTOR FOR MULTIPLEXED μ -TAS DEVICES

(57) Abstract

An electrospray system is disclosed. The electrospray system includes a microdevice (10) comprising wells (12), channels (16), and electrospray tips (14); an electro-pneumatic distributor (22) comprising channels (28) and electrodes (24); a supply block (36) comprising gas supply channel (34) and electric conductor (32); and a gasket (18) with holes (20). The distributor is suitable for simultaneous, selective application of pressure and electric current to individual channels of a microdevice.



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DK	Denmark	LR	Liberia	SE	Sweden		
EE	Estonia			SG	Singapore		

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/00470

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :H01J 49/00, 49/04, 49/10; G01N 27/26

US CL :250/288; 204/600

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 250/288; 204/450, 451, 452, 600, 601, 603

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	XUE et al. Multichannel Microchip Electrospray Mass Spectrometry. Analytical Chemistry. 01 February 1997. Vol.69. No.3. pages 426-430	1
X, P	US 5,872,010 A (KARGER et al) 16 February 1999, see entire document	1
Y, P	US 5,917,184 A (CARSON et al) 29 June 1999, see entire document	1
A	US 5,969,353 A (HSIEH) 19 October 1999	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
B earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

03 APRIL 2000

Date of mailing of the international search report

25 APR 2000

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/00470

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

USPAT, JPOABS, EPO, DERWENT

search terms: microchip, microchannel, microfluidic, microfabricat\$4, micromachin\$4, (lab or laboratory) adj3 chip, mesoscale, electrospray\$3, mass adj spectromet\$5